IN THE CLAIMS

The following listing of claims replaces all previous listings and versions of claim in this application.

1. (Original) An automatic high-precision layer cutting device for separating a layer from a semiconductor substrate comprising:

a fixed positioning member for receiving at least a portion of a semiconductor substrate that has a weakened area therein and a peripheral annular notch that is located away from the weakened area, the positioning member maintaining a predetermined position of the substrate on a support; and

cutting means having at least one blade for contacting the substrate and for inducing a cleaving wave into the substrate, the cutting means being operatively associated with the positioning member so that the at least one blade contacts the annular notch and the positioning member prevents movement of the substrate, so that the at least one blade can induce a cleaving wave of sufficient intensity to both divide the substrate at the notch into first and second parts and detach the layer from the substrate along the weakened area.

2. (Original) The device of claim 1 wherein the positioning member comprises at least one shim.

3. (Original) The device of claim 2 which further comprises a plurality of shims.

4. (Original) The device of claim 2 wherein the shape of the shim is complementary to the shape of the semiconductor substrate.

5. (Original) The device of one of claim 1 wherein the at least one blade is moveable toward and away from the positioning member from a first position where the blade is retracted to allow positioning of the substrate in the device and a second position wherein the blade contacts the annular notch.

6. (Original) The device of claim 1, further comprising a movable support which moves away from the substrate as the blade contacts the annular notch.

7. (Original) The device of claim 1 wherein the positioning member is affixed to a chassis.

8. (Original) The device of claim 1 which further comprises a support substrate that is operatively associated with the positioning member so that the positioning member maintains the position of the semiconductor substrate in a cutting plane that is parallel to the at least one blade and the support member.

9. (Original) The device of claim 8 which further comprises a blade position adjustment element for adjusting the blade along a direction perpendicular to the cutting plane so that the blade can be placed to contact the notch of substrates having different thicknesses.

10. (Original) The device of claim 9 which further comprises a movement member for displacing the blade by a predetermined translation in the cutting plane.

11. (Original) The device of claim 10 wherein the movement member controls the blade to translate in at least one of a continuous manner or an intermittent manner to cut the substrate.

12. (Original) The device of claim 1 wherein the tip of the blade has a vertex angle on the order of 60°.

13. (Original) The device of claim 1 wherein a leading edge of the blade has a circular contour corresponding to a contour of the semiconductor substrate.

14. (Original) The device of claim 13 wherein the blade leading edge covers about one quarter of the periphery of the assembly.

15. (Original) The device of claim 1 wherein a section of the positioning member has an arcuate contour that corresponds to the contour of the semiconductor substrate.

16. (Original) The device of claim 1 wherein the cutting means further comprises a first cutting device and a second cutting device.

17. (Original) The device of claim 16 which further comprises a sensor capable of acquiring at least one parameter representing progress of a cutting operation by the first cutting device, and a trigger device to initiate use of the second cutting device when the parameter reaches a predetermined value.

18. (Original) The device of claim 17 wherein the parameter is related to a measurement of the separation between layers being separated.

19. (Original) The device of claim 16 wherein the first cutting device comprises a first blade, and the second cutting device comprises second and third blades, and wherein the blades are arranged symmetrically about the annular notch.

20. (Original) The device of claim 19 wherein the second and third blades of the second cutting device are moveably mounted on second and third displacement devices, respectively, such that a leading edge of the second and third blades is oriented to tangentially attack the annular notch.

21. (Original) The device of claim 1 wherein the support includes a transparent window located below the substrate.

22. (Original) The device of claim 21 which further comprises a sensor positioned to view the progress of the cleaving wave through the transparent window.

23. (Original) An automatic high-precision cutting method for separating a layer of material from a source substrate comprising:

positioning at least a portion of a semiconductor substrate that has a weakened area and a peripheral annular notch that is located away from the weakened area, into a

fixed positioning member which maintains the substrate in a predetermined position on a support; and

contacting the substrate with at least one blade to induce a cleaving wave into the substrate, the at least one blade being operatively associated with the positioning member so that it contacts the annular notch while the positioning member prevents movement of the substrate, with the cleaving wave being of sufficient intensity to both divide the substrate at the notch into first and second parts and detach the layer from the substrate along the weakened area.

24. (Original) The method of claim 23 which further comprises self-adjusting the relative positions of the substrate and the at least one blade along a direction perpendicular to the cutting plane as the blade contacts the notch, by cooperation between a cutting edge of the blade and the notch.

25. (Original) The method of claim 23 which further comprises monitoring the progress of the cleaving wave by analyzing light transmitted through the semiconductor substrate.

26. (Original) The method of claim 25 which further comprises controlling the movements of the at least one blade with a displacement device depending on the monitored progress of the cleaving wave.

27. (Original) The method of claim 23 which further comprises monitoring at least one parameter representative of the progress of a cutting operation of a first cutting device during a first cutting phase, and controlling a second cutting device during a second cutting phase as a function of the monitored parameter.

28. (Original) The method of claim 23 which further comprises attacking the substrate at a first location with a first cutting blade, and attacking the substrate at a second location a distance apart from the first location with at least a second cutting blade.

29. (Original) The method of claim 28 further comprising attacking the substrate at a third location with a third cutting blade, wherein the first, second and third

cutting blades are arranged symmetrically about the annular notch of the semiconductor substrate.

30. (Original) The method of claim 23, which further comprises supporting the substrate on a support prior to contact by the at least one blade and moving the support away from the substrate as the blade contacts the annular notch.

31. (Original) The method of claim 23 which further comprises viewing the progress of the cleaving wave with a sensor through a transparent window located in the support.